61
F4

United States Department of the Interior
Fish and Wildlife Service

Fishery Leaflet 124

LIBRARY
FISH & WILDLIFE SERVICE
PACIFIC OCEANIC FISHERY
INVESTIGATIONS

Chicago 54, Ill. May 1945

DERMATITIS IN THE FISH INDUSTRY*

LOUIS SCHWARTZ[1] AND IRVING R. TABERSHAW[2]

THE FREQUENCY with which dermatitis occurs among fishermen and fish handlers makes it the chief occupational hazard in this industry. Numerous investigators have described the various skin lesions of fishermen in different parts of the world (1, 2, 3). While many of these infections are potentially common to all fishermen, specific factors such as climate, type of fish handled, dietary habits, sanitation, type of ship and length of voyage influence the frequency, severity and type of lesion.

The range of fishing from the New England ports extends from the Capes of Virginia to the banks off Nova Scotia and Newfoundland. The principal fish caught in these waters are the cod, haddock, mackerel, herring, rosefish, pollock, whiting, sole, and flounder. Herring and mackerel swim near the surface of the water and are caught in purse seines, gill nets, pound nets, and in weirs. The other fish are taken mainly by "trawling" or dragging the floor of the ocean with huge cone-shaped nets, on long lines, and by gill nets. Salmon are caught in traps, by purse seines and in gill nets. Mackerel are taken by lines, scoop nets, and purse seines, while the whole catch of sardine is made with purse seines or similar gear. Tuna also are taken in purse seines, and by using poles equipped with a short line and a barbless hook. As the fish is hooked, it is skillfully flipped on the deck, and the unbarbed hook disengages itself.

Fish may be processed for sale in a number of ways. First, they may be sold in the fresh state either round, dressed, or filleted. Secondly, fish may be frozen. In this instance, the fish may be frozen as it comes from the water, or scaled, washed, and either dressed or filleted. Fillets are boneless strips of meat which are cut from the body of the fish. The fillets are washed, packaged, and placed in the freezer. After freezing they are then ready for shipment in refrigerator trucks and cars. Thirdly, the fish may be prepared for canning. After the fish are cleaned and washed, they are cut into suitable sized pieces or the meat is separated from the bones and packed into cans which are capped, sterilized, washed in a cleansing solution to remove oil or fragments of fish, and labeled. Fourthly, they may be salted, although this is now relatively unimportant. In this case, they are split open, cleaned, thoroughly washed and packed and salted into "butts" (large barrels) until they are thoroughly cured. They are then rewashed and spread out on long racks with the flesh side up to dry in the sun and wind. This process is called "flaking" and requires from a few hours to several days depending on the degree of moisture to be removed. After drying, they may be immediately packed for shipment or further processed by having the skin and bones removed.

The offal derived from fish is called "waste" or "gurry" and is used primarily in the preparation of fish meal for chicken and animal feed, fish oils for animal feeding and industrial uses, and glues. This refuse consists of all portions unsuitable for eating, such as the head, fins, tails, skins, entrails, scales, etc. Some of these manufacturing processes involve considerable handling of the gurry with resulting dermatitis similar in all respects to that from fresh fish.

The dermatitis that results from the handling of fish falls into several categories. Dermatitis is frequent, and in any fishery a number of cases may be seen at any one time. All types of workers engaged may be affected, including the fishermen, dock or shore workers and fish handlers engaged in processing the fish. The salt used in salting the fish is usually handled with the bare hand, but unless the individual is suffering from fissures or abrasions, apparently does not cause any dermatitis and, in fact, may harden the skin. The alkali used in washing the sealed cans to remove oil or fragments of fish occasionally is the cause of a skin irritation. While not primarily a skin lesion, Weil's disease occurs frequently in fish workers through infection by an infested rat (4). Fish cleaners engaged in cleaning and filleting fish are especially prone to abrasion of the skin and may develop the disease, since rats are frequently found in such establishments. The disease, which is characterized by fever, jaundice and hemorrhage under the skin, occurs in from four to nineteen days after infection. The diagnosis is usually

* Received for publication September 18, 1944.

[1] Chief, Dermatoses Section, Industrial Hygiene Division, U. S. Public Health Service.

[2] Surgeon (R), U. S. Public Health Service, and Physician, Massachusetts Division of Occupational Hygiene.

Reprinted from The Journal of Industrial Hygiene and Toxicology, vol. 27, no. 1, January 1945.

made by positive serological agglutination tests, since the organism is demonstrated only infrequently in the urine and with great difficulty in the blood.

The types of dermatological conditions noted may be grouped in the following classifications:

A. *Abrasions, lacerations and fissures.* These injuries are common throughout the industry, since many sharp and irregular objects are handled. Many of the fish have bony spines which lacerate the hands. Fishing gear may also be responsible for cutting the hands.

B. *Secondary infections.* Infection with staphylococcus and occasionally with streptococcus occurs frequently. Staphylococcus infection is most commonly seen around the wrists of the fishermen and is apparently due to secondary infection of the traumatized areas from the dirty oilskins. The lesions are called "pigeons" by the fishermen and are characterized by chronicity and induration. They differ in no way from any chronic boil and yield to cleanliness, hot soaks and prevention of further irritation. These staphylococcus infections occasionally also occur along the collar line where the oilskins rub against the skin of the neck and may contaminate any break of the skin.

C. *Bites and stings.* Bites have been known to occur from dogfish which may be picked up with a catch, and in one instance produced an acute suppurative tenosynovitis. Dermatitis and infection may occur from the various stinging fish which the water may contain. The sting of the sea anemone causes redness and blisters in a few minutes, and abscesses may follow. The sting of certain rays, the jellyfish, Portuguese man-of-war and sea nettles are some of the other causes of dermatitis in men working with sea water. The conjunctivitis which occasionally occurs in workers engaged in washing sardines caught on the west coast is probably due to the presence of portions of jellyfish or strings of sea nettles adhering to the scales of sardines, or to hydrogen sulfide evolved from decaying fish.

D. *"Redfeed" dermatitis.* This lesion occurs only in the months from June to September when mackerel are in season. Mackerel feed on minute crustaceans, one of the most common of which is "redfeed," a reddish-orange crustacean occurring in vast swarms. Fish containing these do not keep well after being caught. A few hours later the flesh of the fish softens, and after twenty-four hours the flesh is broken down to the spine. There is also a rapid evolution of hydrogen sulfide from such fish. There are other varieties of organisms of a reddish color eaten by mackerel which do not cause such spoilage. They are dark red or purple in color, whereas the true "redfeed" is orange. This redfeed, plus digestive juice from the stomach of the mackerel, burns the hand and is sometimes called "cayenne" or "red pepper." After one or more days of exposure to this material, the skin of the hands becomes swollen and intensely red with numerous superficial ulcerations. The areas affected are those in contact with the redfeed and occur chiefly along the palms and side of the fingers. The lesion is painful but heals quickly upon application of mild soaks, such as boric acid or dilute epsom salts, followed by boric acid or zinc oxide ointment, and avoidance of further contact with the material.

On the west coast, dermatitis develops in individuals who come in contact with the skin of the skipjack. This dermatitis usually develops about one week after starting work and starts on the forearms above the gloves. Spoiled fish is said to cause more dermatitis than unspoiled ones. The skin of the tuna and the skipjack (skipjack is of the tuna family) is a thin slimy membrane covering the scales which can be easily scraped off with the fingernail and is said to contain a substance which is a primary skin irritant. It will cause dermatitis in anyone working for any length of time with ungloved hands.

Rosefish, also called redfish, is found in great quantities in Atlantic water and is usually filleted for quick freezing. Filleting is a hand operation, but may be done mechanically. In most instances it is done by a worker grasping the fish in his left hand by the head and then with a stroke of the knife cutting off the boneless material on one side, turning the fish on its other side and removing the other strip. The rosefish has numerous pointed bones extending back from its head, and if the fish is not grasped carefully, a puncture of the skin may occur. These puncture wounds are in some cases followed by lymphangitis and lymphadenitis which occasionally results in suppuration of the involved glands. For some unknown reason the incidence of rosefish infection has diminished greatly in the past few years.

E. *Erysipeloid.* This skin lesion rarely occurs on the Pacific coast, but is very frequent along the Atlantic coast. It is derived chiefly from contact with gurry or the remains of any kind of fish that has undergone putrefactive changes. In handling gurry, abrasion, laceration or puncture of the skin

is common, and erysipeloid may result. Erysipeloid has been demonstrated to be caused by the organism Erysipelothrix rhusopathia, and Klauder in an analysis of 100 cases states that 88 were occupational in origin, and of these 17 occurred in individuals handling fish.

The cases which occur from the handling of fresh fish are usually mild in nature and consist of a localized infection of the fingers and hands. There is always a history of injury, usually one of puncture of the skin by a fish bone. It has been noted that if free bleeding occurs following such a puncture, infection is rare. However, if no bleeding occurs, almost invariably erysipeloid develops. The disease appears within a period of several hours to one or two days. The lesion is always on the hand and appears first at the site of puncture, and there is moderate pain followed by swelling and redness. The erythema has a distinct purplish hue and progresses down the finger into the web and frequently ascends alongside the adjoining finger. The workers call this type of infection "run around." The progress of the line of redness is slow, sharply defined and slightly elevated with involution in the central portion. Swelling may be severe and interfere with function. Arthritic symptoms may occur and may persist after the cutaneous lesions have disappeared, but this is rare.

Klauder and others have reported cases of generalized infection which were in several instances followed by death. This occurs very rarely in those who handle and process fish soon after they are caught. The original site of puncture occasionally suppurates very slightly, and in some instances a drop of pus may be evacuated. Vesicles described by others have not been noted in our cases. Lymphangitis is frequent, and many of the workers complain of pain and tenderness along the arm and forearm, although enlarged lymph glands are palpable only in a few instances. In one severe case which extended above the wrist, slight constitutional symptoms were noted which consisted of a mild rise in temperature to 99.5°. Fishermen, a hardy group of workers, rarely stop work on account of symptoms.

F. *Skin cancer.* Individuals exposed to excessive amounts of sunlight are apt to develop carcinoma. The frequency of this condition is increased by exposure to tar. Fishermen use tar on nets to prolong their life and to impregnate rope, cables and tarpaulins. They also have the habit of holding the needle in the mouth while mending nets. The combination of exposure to the tar and sunlight has led to an increased incidence of epithelioma (8).

G. *Allergy.* Some few workers develop dermatitis because of allergy to fish oils. Such cases usually occur among those handling cooked fish.

Treatment

Treatment of *erysipeloid* consists of first evacuating the organism, if possible. Fishermen from experience have learned to make bone punctures bleed if they do not do so spontaneously. In severe cases the finger may be put in a splint. The treatment used successfully in one plant has been frequently and prolonged chlorine soaks, followed by the application of ichthyol ointment. The sulfonamides and X-ray therapy have also been used successfully and in severe cases the use of immune serum may be advisable, although we have had no experience with this method of treatment. In some cases the original lesion may become quiescent and after three or four days suddenly become active again. In some instances spread of infection may occur even fourteen to eighteen days after the initial infection. X-ray examination of the affected parts will show marked soft tissue swelling in the region of the joints, but no bony changes have been noted.

The treatment for the *bites of fish* is similar to treatment for snake venom, that is, the wound is opened and washed with a strong solution of potassium permanganate. The treatment for lesions from sea nettle and jellyfish is to wash the part with a solution of sodium bicarbonate to neutralize the acid contained in these bites. Treatment of *staphylococcus* and other *secondary infections* should consist of wet soaks and incision and drainage when indicated. *"Redfeed" dermatitis* is best treated by boric acid soaks. Rosefish poisoning is treated by incision of the area of bone penetration and evacuation of the suppurative material which may be present. Arm baths using a hot chlorine solution followed by an ichthyol dressing applied to the incised area gives very satisfactory results.

Prevention

The prevention of dermatitis from fish may be accomplished by the use of rubber gloves. These gloves should have treads on the finger tips to enable the workers to handle the slippery fish. Also, they should be of heavy enough material to prevent puncture of the fingers. A light rubber

glove may be used if a cotton glove is pulled over it to provide a gripping surface. Two pairs of gloves should be issued to each worker with instructions to wear one pair for half a shift and then wash the gloves with water and permit them to dry for the next shift while wearing the second pair. If puncture should occur with the bones of the rosefish or gurry, the wound should be made to bleed freely. A small amount of chlorine added to the water used to wash the knives and gloves has proved helpful in destroying contaminating organisms.

Acknowledgement is gratefully made for the assistance of Dr. Richard F. Welch, Medical Director of General Seafoods Corporation, Boston.

BIBLIOGRAPHY

(1) Schwartz, L. and Tulipan, L.: Occupational diseases of the skin. Lea & Febiger, pp. 603–605, 1939.

(2) White, R. Prosser: The dermatergoses or occupational affections of the skin. H. K. Lewis & Co., Ltd., London, pp. 405–407, 1934.

(3) Schwartz, Louis and Warren, L. H.: Occupational and related dermatoses. Abstracts from the literature for the years 1935 to 1939, inclusive. U. S. Public Health Bull. No. 266, 1941.

(4) Glotzer, Solomon: Weil's disease, report of a case in a fish worker. J. A. M. A., *110:* 2143–2145, 1938.

(5) Klauder, J. V.: Erysipeloid: bacillus of swine erysipelas infection—a disease of industry. This J., *14:* 222–234, 1932.

(6) Klauder, J. V., Kramer, D. W., Nicholas, L.: Erysipelothrix rhusiopathiae septicemia: diagnosis and treatment. J. A. M. A., *122:* 938–943, 1943.

(7) Klauder, J. V.: Erysipeloid as an occupational disease. J. A. M. A., *111:* 1345–1348, 1938.

(8) Shambaugh, P.: Tar cancer of the lip in fishermen. J. A. M. A., *104:* 2326, 1935.

112440